

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-286583

(43)Date of publication of application : 27.10.1998

(51)Int.Cl. C02F 3/06
C02F 1/463
C02F 1/465

(21)Application number : 09-111869

(71)Applicant : HIRAI KOGYO KK

(22)Date of filing : 14.04.1997

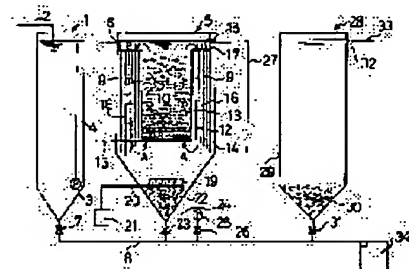
(72)Inventor : TERADA SETSUO
FUKUI JUNICHIRO
HOJO FUMIYASU
MIDORIKAWA SHUJI

(54) APPARATUS FOR TREATING PHOSPHORUS-CONTAINING ORGANIC WATER APPARATUS

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an apparatus of simple structure for the nitrification and denitrification and the improvement of the removal ratio of phosphate ions in a single treatment tank.

SOLUTION: An inner tank (filter bed section) 10 filled with precipitated carriers 13 such as oyster shells and an outer tank (filter bed section) 11 suspending screen-shaped porous carriers 16 are formed by dividing a section under the water level of a treatment tank 5 by a partition wall 9, and a raw water flow inlet 6 and a treated water flow outlet 18 are provided on the outer tank 11, while an oxygen containing air diffuser 14 is provided on the lower section of the inner tank 10. BOD is reduced remarkably by providing the precipitated carriers 13 and the screen-shaped porous carriers 16.



LEGAL STATUS

[Date of request for examination] 03.03.1999

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number] 3268385

[Date of registration] 18.01.2002

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the Lynn content organic nature sewage disposal equipment which processes the sewage of organic nature, such as the Lynn content organic waste water, such as food works, a hogger, and a public sewage place.

[0002]

[Description of the Prior Art] Conventionally, as an art of Lynn content organic nature sewage, coagulating sedimentation or the condensation filtration process is known. It has these methods as a complete-treatment institution for many years, and they are. As the other sewage disposal methods, there are a crystallization method, a soil-treatment method, etc. and there are an adsorption process, ultrafiltration, etc. as a special thing. Management of a cost side and maintenance was difficult for the dephosphorylation technology by these methods having large biochemical oxygen demand (BOD) etc., and the supply structure and the controlling mechanism of a medicine needed to be simplified.

[0003] As one of the methods of solving this problem, the metal was dissolved electrochemically and the electrolytic decomposition process which generates condensation ion was thought out. However, this electrolytic decomposition process had the problem which should still be solved about regulation of pH, the electrode material, etc.

[0004]

[Problem(s) to be Solved by the Invention] this invention is made in view of this point, and there is no problem in regulation of pH, an electrode material, etc., and, moreover, it tends to offer Lynn content organic nature sewage disposal equipment with little BOD.

[0005]

[Means for Solving the Problem] By invention indicated by the claim 1, this invention as the above-mentioned The means for solving a technical problem The equalizing tank which stores Lynn content organic nature sewage and is adjusted to an almost uniform component, The processing tub which carries out an activated sludge treatment by the microorganism which adhered organic nature sewage after being adjusted by this equalizing tank to a suspension microorganism, fixed-bed support, or semipermanent floor support, In the Lynn content organic nature sewage disposal equipment which consists of a setting tank which sediments the suspended matter currently mixed from the water processed by this processing tub While preparing a raw water input and a treated-water tap hole in the filter bed section which divided the filter bed section which filled up the bottom of the tub inner-drainage side of the aforementioned processing tub with sedimentation nature support, such as oyster husks, and the filter bed section which hung curtain-like porosity support by the septum, and hung curtain-like porosity support It is characterized by arranging the diffuser of oxygen content gas at the lower part section of the filter bed section of sedimentation nature support, such as the aforementioned oyster husks.

[0006] Moreover, in invention indicated by the claim 2, in what was indicated by the claim 1, while installing the electrolyzer which used the metal magnesium electrode for the pars basilaris ossis occipitalis of the aforementioned processing tub, and the pars intermedia of a diffuser, it connects with the upper part a little, and the branch pipe of the diameter of a small sum is characterized by the thing of a processing tub soffit for which the nose of cam was bent so that the wall of a processing tub might be met from piping for return sludges prepared in the processing tub lower part.

[0007] The Lynn content organic nature sewage which is raw water flows into the outside tub which hung between curtain-like porosity support, and flows down between curtain-like porosity support. In the meantime, in a management, while the organic substance is disassembled by the anaerobic microorganism as it becomes a lower layer by the aerobic bacteria, it results in a pars basilaris ossis occipitalis. The phosphoric-acid ion in the disassembled organic compound reacts with the magnesium-ion eluted from the electrolyzer, serves as insoluble phosphorus compounds and sediments.

[0008] The sewage containing the residual organic substance goes into the upper counterflow of the inner lift filled up with oyster husks etc., and while there is much dissolved oxygen and an aerobic bacteria and protozoa pass through between the sedimentation nature support which is carrying out many adhesion habitations, the residual organic substance is disassembled. Organic nitrogen compounds serve as a nitrogen content child through a nitrous acid and a nitric acid in the process, and it disperses in the air, and comes out out of a system. It results in the upper part, and flows back and circulates to an outside tub again. The sewage concerned is purified gradually in the meantime. The overflow of the purified water is carried out from the upper part of a processing tub, it is introduced into a setting tank, suspension sludge etc. sediments, and supernatant liquor is

discharged.

[0009] The sludge which is sedimenting at the pars basilaris ossis occipitalis of a processing tub pulls out the branch pipe of the diameter of a small sum from piping for return sludges from the setting tank connected to the processing tub, connects a pump with this, from the inlet which piped the processing tub lower part separately, with a pump, it carries out pressurization injection, stirs the precipitation sludge inside a processing tub, and promotes the reaction of phosphoric-acid ion and magnesium ion.

[0010].

[Embodiments of the Invention] Hereafter, the gestalt of operation of this invention is explained about drawing 1. 1 is the equalizing tank which can be put on the biological activity sewage disposal process of Lynn content organic nature sewage, and the lower part is formed in the shape of a funnel. The raw water piping 2 which receives industrial waste water is carrying out opening to the upper part of an equalizing tank 1, and an equalizing tank 1 adjusts the industrial waste water introduced from this raw water piping 2 to an almost uniform component. The storage pump 3 is formed near the pars basilaris ossis occipitalis of an equalizing tank 1, the water of the portion is inhaled, and water is supplied to the raw water input 6 of the processing tub 5 put side by side to the equalizing tank 1 through piping 4. The lowest edge of an equalizing tank 1 is connected to the piping 8 for a sludge transfer through the bulb 7.

[0011] The vertical septum 9 was formed in the portion (portion which is not a funnel-like) of the same upper size, and the processing tub 5 is also divided to the tub (filter bed section) 11 outside the inner lift (filter bed section) 10 of the inside, and an outside, although the lower part is formed in the shape of a funnel. A supporter 12 is attached in the lower part of a septum 9, and it fills up with the sedimentation nature support 13 which consists of oyster husks etc. on it.

[0012] The supporter 12 is formed with the board which has a network or a hole, a diffuser 14 is arranged by the lower part, and the gas containing the oxygen from piping 15 is supplied to an inner lift 10. The curtain-like porosity support 16 is perpendicularly formed in the interior of the outside tub 11, and opening of the above-mentioned raw water input 6 is carried out to the upper part. The obstruction 17 was formed in a part of processing tub 5 (right-hand side in drawing), and the wall of the processing tub 5 and the curtain-like porosity support 16 are divided. And the treated-water tap hole 18 is formed in the upper-limit section of the divided portion.

[0013] The electrolyzer 19 which made magnesium the discharge electrode is formed in the place near the pars basilaris ossis occipitalis of the processing tub 5, and the electric wire 20 connects with DC power supply 21. An excess sludge 22 collects on the lower part of the electrolyzer 19. The lowest edge of the processing tub 5 is connected to piping 8 through the bulb 23. The end of the branch pipe 24 bent so that pressurization water might be turned to the wall surface of the processing tub 5 and could be injected is connected to the upper portion a little from the lowest edge of the processing tub 5. Although the other end of this branch pipe 24 is connected to piping 8, the bulb 26 is connected with the pressurization perfusion pump 25 at the interstitial segment. Although illustration is not carried out, the nose of cam of a branch pipe 24 is bent so that the wall of the processing tub 5 may be met.

[0014] The upper limit of piping 27 is connected to the treated-water outlet 18 of the processing tub 5. And the soffit of this piping 27 is connected to the treated-water acceptance mouth 29 prepared in the low portion from the middle of a setting tank 28 established in the processing tub 5 by approaching. The lower part is formed also for the setting tank 28 in the shape of a funnel, and sedimentation sludge 30 collects on the portion. And the lowest edge is connected to piping 8 through the bulb 31. The discharge mouth 32 is formed in the upper part of a setting tank 28, and the water after processing is discharged from the piping 33 connected here.

[0015] The excess-sludge depot 34 is connected to the duct 8 connected to the lowest edge of an equalizing tank 1, the processing tub 5, and a setting tank 28 through the bulb 7, the bulb 23, and the bulb 31.

[0016] Thus, the constituted equipment is used for carrying out an activated sludge treatment by the microorganism to which a suspension microorganism, fixed-bed support, or semipermanent floor support adhered organic nature sewage.

[0017] An operation of the water treatment performed using the above-mentioned equipment is explained. The Lynn content organic nature sewage discharged from food works etc. is led in an equalizing tank 1 from the raw water piping 2, and is adjusted to an almost uniform component here. The treated water to which it was adjusted and the component became uniform is inhaled with the storage pump 3 prepared near the pars basilaris ossis occipitalis of an equalizing tank 1, flows from piping 4 to the raw water input 6 of the processing tub 5, and goes into a tub (filter bed section) 11 outside the processing tub 5.

[0018] The treated water included in the outside tub 11 flows into the inner lift (filter bed section) 10 which flowed down passing through between the curtain-like porosity support 16 which hung in the processing tub 5, resulted in the soffit of a septum 9, and has produced the upward style by the aeration from a diffuser 14, as Arrow A shows, it is reversed and it goes up, it results in the upper limit of an inner lift 10, as Arrow B shows, flows back to the outside tub 11 again, and repeats circulation.

[0019] Although Lynn content organic nature sewage flows into the outside tub 11 first, the amount of dissolved oxygen decreases and is presenting anaerobic condition, so that it results in the pars basilaris ossis occipitalis of the processing tub 5 from a management, since aeration of the outside [this] tub 11 is not carried out. Therefore, although an aerobic bacteria increases to a carrier surface and the anaerobic microorganism is also increasing the microbial population which inhabits the curtain-like porosity support 16 which hung inside support in the management, in order that dissolved oxygen may run short so that it becomes a lower layer, the survival rate of the aerobic-bacteria group of a carrier surface decreases, and, instead, the survival rate of an anaerobic microorganism group increases. Therefore, the sewage which passes the outside tub 3 is begun, and is digested by the aerobic bacteria, and, next, digestive decomposition removal is carried out by the anaerobic microorganism.

[0020] It results in the lower part in a tub in the state, and it precipitates, and dissociates out of sewage, and the microorganism

which carried out ablation defluxion with SS in sewage (suspended solid) collects on the pars basilaris ossis occipitalis of the processing tub 5, and is decomposed by the anaerobic microorganism. It flows into an inner lift 10, the abundant conditions of dissolved oxygen are maintained by the aeration from a diffuser 14, and digestive decomposition of the sewage concerned containing the residual organic substance which passed the outside tub 11 is efficiently carried out by an aerobic bacteria, protozoa, etc. At this time, the nitrogen in the organic substance is also disassembled and it vaporizes out of a system as nitrogen gas. In this way, Lynn content organic nature sewage is disassembled efficiently.

[0021] The purified water goes up along with a septum 17, the overflow of it is carried out from the treated-water outlet 18 of the upper-limit section, it is sent to a setting tank 28, and is discharged from the discharge mouth 32 after sedimenting suspended matter, such as SS currently mixed. The sedimentation sludge 30 which sedimented is sent to the excess-sludge depot 34 through piping 8, and a part is returned to the processing tub 5 and used as stirring and the source of activated sludge (microorganism) of sedimentation sludge 22.

[0022] In the sewage by which biological treatment was carried out, the phosphoric acid made in disassembly of the organic substance exists in the state of ion. although the magnesium compound, the iron compound, etc. were poured into the anaerobic-treatment tub, it supplemented with Lynn and sedimentation processing was carried out conventionally -- this invention -- setting -- the lower part of the processing tub 5 -- the electrolyzer 19 -- preparing -- metal magnesium -- an anode plate -- carrying out -- cathode -- magnesium -- ** -- a metal, for example, iron, copper, etc. are used If a direct current is passed from DC power supply 21 to this electrolyzer 19, magnesium will be electrolyzed and will begin to melt underwater. And it reacts with Lynn which exists underwater, and it becomes an insoluble phosphoric-acid compound, sediments, and is discharged out of a system with an excess sludge.

[0023] As a flocculant, since this excess sludge is not using the metal detrimental to vegetation, it can dry and it can utilize iron, zinc, aluminum, etc. effectively as manure of magnesia (magnesium) Lynn content.

[0024] Although decomposed by the anaerobic microorganism, through the branch pipe 24 connected to the upper part a little, with the pressurization perfusion pump 25, sedimentation sludge 22 collected on the pars basilaris ossis occipitalis of the processing tub 5 carries out pressurization injection intermittently, stirs the sewage containing the sedimentation sludge 30 of a setting tank 28, diffuses Lynn, and can remove underwater Lynn from a pars basilaris ossis occipitalis more effectively by making it react with magnesium. This method serves also as loss in quantity of eccrisis sludge while reworking sedimentation sludge 30.

[0025] The bulb shown in drawing 1 with signs 7, 23, 26, and 31 is automatically opened if needed and closed suitably with manual operation.

[0026]

[Example] Although the example of this invention performed using the equipment of drawing 1 is explained hereafter, this invention is not limited to this. The used sewage is the fishes relation waste water of a cannery, and the equalizing-tank raw water of Table 1 was used for the water quality.

[0027]

[Table 1]

資料 項目	調整槽原水 mg/L	※ ①		②	
		澄流水 (mg/L)	放流水 (mg/L)	澄流水 (mg/L)	放流水 (mg/L)
BOD	165.3	0.7	2.5	27.8	18.1
COD	72.8	3.2	2.8	9.5	6.8
SS	197.4	7.0	5.1	17.4	9.2
T-N	33.7	4.3	2.3	8.9	6.1
T-P	9.52	0.5	0.1	8.5	8.3

[0028] Oyster husks were used for sedimentation nature support, and felt was used for curtain-like porosity support. Moreover, the magnesium board was used for the anode plate and the copper plate was used for cathode at the electrode of the electrolyzer 19. The microorganism was cultivated for 15 days, when the processing tub 5 of 10l. of content volume was made to fully adhere to support, the water in a tub was sampled to it, and data raw water was poured into it. When the residence time of a treated water was carried out at the water temperature of 21-25 degrees C for 8 hours, the result of ** of Table 1 was obtained.

[0029]

[Comparative Example(s)] The filter bed filled up with the sedimentation nature support usually performed to the processing tub 5 of 10l. of content volume same as an example of comparison as an example is installed. The place which carried out continuation pouring and processed data raw water at the rate of 21 ml/min after cultivating for seven days at 3000 ppm and simian-virus3010.5% by setting activated sludge to MLSS for 20-25 degrees C of atmospheric temperature, and residence-time 8 hours, As a result of bottling water 16 hours after (equivalent to data raw water 2 batch) and performing water quality analysis, the result of ** of Table 1 was obtained.

[0030] Although the example and the example of comparison were shown in Table 1, compared with the example of comparison, disassembly of 607 mg/L and the organic substance of BOD was [the example] good, and the amount (T-N) of total nitrogens

was [the total amounts (T-P) of Lynn of the throughput of 2.3 mg/L and Lynn] also 0.1 mg/L and 99% of elimination factor.

[0031]

[Effect of the Invention] Since this invention is Lynn content organic nature sewage disposal equipment constituted as explained above and it will use together sedimentation nature support and curtain-like porosity support to the biological-treatment method of conventional Lynn content organic nature sewage, compared with the conventional thing which does not use these, BOD decreases remarkably.

[0032] Moreover, by having installed the electrolyzer which used the metal magnesium electrode for the pars basilaris ossis occipitalis of the aforementioned processing tub, and the pars intermedia of a diffuser in the above-mentioned equipment, by ionizing metal magnesium, the equipment which pours in an adsorbent becomes unnecessary and the laborsaving of an effort of it is attained.

[0033] Moreover, it became possible to stir sedimentation sludge, without installing stirring equipment specially, since the sedimentation sludge water of a setting tank was used by this branch pipe by having prepared the branch pipe of the diameter of a small sum which bent the nose of cam so that the wall of a processing tub might be met in stirring of the precipitation sludge of a processing tub.

[0034] Furthermore, since the toxic substance to vegetation, such as aluminum and iron, is not contained in abandonment sludge, it can be made to be able to dry and can use as an organic fertilizer.

[Translation done.]

* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The equalizing tank which stores Lynn content organic nature sewage and is adjusted to an almost uniform component. The processing tub which carries out an activated sludge treatment by the microorganism which adhered organic nature sewage after being adjusted by this equalizing tank to a suspension microorganism, fixed-bed support, or semipermanent floor support. The setting tank which sediments the suspended matter currently mixed from the water processed by this processing tub. The filter bed section which is Lynn content organic nature sewage disposal equipment equipped with the above, and filled up the bottom of the tub inner-drainage side of the aforementioned processing tub with sedimentation nature support, such as oyster husks, and the filter bed section which hung curtain-like porosity support. It divides by the septum, and while preparing a raw water input and a treated-water tap hole in the filter bed section which hung curtain-like porosity support, it is characterized by arranging the diffuser of oxygen content gas at the lower part section of the filter bed section of sedimentation nature support, such as the aforementioned oyster husks.

[Claim 2] A processing tub soffit is Lynn content organic nature sewage disposal equipment according to claim 1 characterized by having connected with the upper part, and bending the nose of cam so that the wall of a processing tub may be met a few about the branch pipe of piping for return sludges prepared in the processing tub lower part while installing the electrolysis equipment which used the metal magnesium electrode for the bottom of the aforementioned processing tub, and the pars intermedia of a diffuser to the diameter of a small sum.

[Translation done.]

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平10-286583

(43) 公開日 平成10年(1998)10月27日

(51) Int. Cl. ⁴	類別記号	P I
C 0 2 F 3/06	Z A B	C 0 2 F 3/06
1/463		1/46
1/465		1 0 2

審査請求 未請求 請求項の数 2 F D (全 5 頁)

(21) 出願番号 特願平9-111869

(22) 出願日 平成9年(1997)4月14日

(71) 出願人 597017672

平井工業株式会社

静岡県静岡市横内町9番地

(72) 発明者 寺田 繁雄

静岡県静岡市瀬名中央三丁目27番4号

(72) 発明者 植井 潤一郎

静岡県静岡市上伝馬7-22

(72) 発明者 北條 文靖

静岡県庵原郡由比町由比283

(72) 発明者 越川 修二

静岡県清水市大坪一丁目7番36号

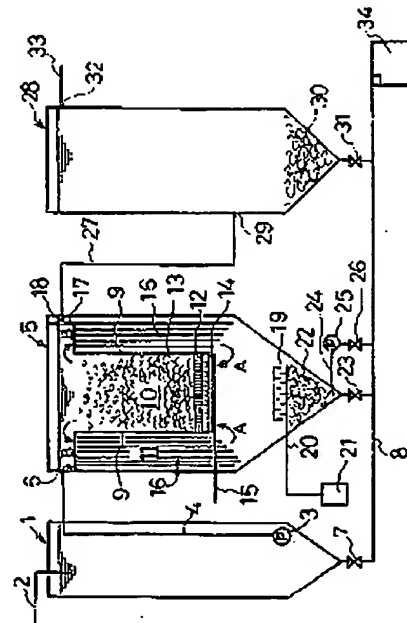
(74) 代理人 弁護士 荻 経夫 (外2名)

(54) 【発明の名称】 リン含有有機性汚水処理装置

(57) 【要約】

【課題】 単一の処理槽で硝化脱窒素処理とリン酸イオンの除去率を向上させる装置を、簡単な構造で提供する。

【解決手段】 処理槽5の槽内水面下にカキ殻等の沈降性担体13を充填した内槽(ろ床部)10と幕状多孔質担体16を垂下した外槽(ろ床部)11とを、隔壁9により区画し、外槽11に原水流入口6および処理水流出口18を設け、内槽10の下方部に酸素含有ガスの散気装置14を設けた。沈降性担体13と幕状多孔質担体16を設けたことにより、BODが著しく減少する。



(3)

特開平10-286583

3

られており、その部分の水を吸入して、配管4を通じて調整槽1に併設された処理槽5の原水流入口6に送水する。調整槽1の最下端はバルブ7を介して汚泥移送用の配管8に接続されている。

【0011】処理槽5も下部が漏斗状に形成されているが、その上方の同一太さの部分（漏斗状でない部分）に垂直方向の隔壁9が設けられて、その内側の内槽（ろ床部）10と外側の外槽（ろ床部）11に区画している。隔壁9の下部には保持体12が取付けられ、その上に、

カキ殻等からなる沈降性担体13が充填されている。【0012】保持体12は側または孔を有する板で形成されており、その下部には散気装置14が配設され、配管15からの酸素を含有したガスが内槽10に供給されるようになっている。外槽11の内部には幕状多孔質担体16が垂直方向に設けられており、前述の原水流入口6は、その上部に開口している。処理槽5の一部（図における右側）には隔壁17が設けられ、処理槽5の内壁と幕状多孔質担体16とを区画している。そしてその区画された部分の上端部に処理水出口18が設けられて

いる。【0013】処理槽5の底部に近いところにはマグネシウムを放電極とした電解装置19が設けられ、電解20により直流電源21に接続されている。電解装置19の下部には余剰汚泥22が溜るようになっている。処理槽5の最下端はバルブ23を介して配管8に接続されている。処理槽5の最下端より少し上の部分には、加圧水を処理槽5の壁面に向けて噴射できるように曲げた枝管24の一端が接続されている。この枝管24の他端は配管8に接続されているが、その中間部分には加圧注入ポンプ25とバルブ26が接続されている。図示はしないが、枝管24の先端は、処理槽5の内壁に沿うように曲

げてある。【0014】処理槽5の処理水出口18には配管27の上端が接続されている。そしてこの配管27の下端は、処理槽5に近接して設けられた沈殿槽28の中間より低い部分に設けられた処理水受入口29に接続されている。沈殿槽28も下部が漏斗状に形成されており、その部分には沈降汚泥30が溜るようになっている。そして最下端はバルブ31を介して配管8に接続されている。沈殿槽28の上部には放流口32が設けられており、こ

こに接続された配管33から、処理後の水を放流するようになっている。【0015】バルブ7、バルブ23およびバルブ31を介して調整槽1、処理槽5および沈殿槽28の最下端に接続された管路8には、余剰汚泥貯留槽34が接続されて

いる。【0016】このように構成された装置は、有機性汚水を浄化微生物もしくは固定床担体あるいは半固定床担体に付着された微生物により活性汚泥処理をするのに使用

4

【0017】上記装置を使用して行う水処理の作用を説明する。食品工場等から排出されるリン含有有機性汚水は、原水配管2から調整槽1内に導かれ、ここではほぼ均一な成分に調整される。調整され成分が均一になった処理水は、調整槽1の底部近傍に設けられた揚水ポンプ3によって吸入され、配管4から処理槽5の原水流入口6に流れ、処理槽5の外槽（ろ床部）11に入る。

【0018】外槽11に入った処理水は、処理槽5内に垂下された幕状多孔質担体16の間を通過しながら流下して隔壁9の下端に至り散気装置14からの曝気によって上向き流の生じている内槽（ろ床部）10に流入し、矢印Aで示すように反転して上昇し、内槽10の上端に到り、矢印Bで示すように再度外槽11に逆流して循環を繰り返す。

【0019】リン含有有機性汚水は、まず、外槽11に流入するが、この外槽11は曝気されないため、上層部より処理槽5の底部に至るほど、溶存酸素の量は減少して嫌気状態を呈している。そのため、垂下した幕状多孔質担体16に生息する微生物群も上層部では担体表面には好気性微生物が増殖し、担体内部には嫌気性微生物が増殖しているが、下層になるほど溶存酸素が欠乏するため、担体表面の好気性微生物群の生存割合が減少し、代

わって嫌気性微生物群の生存割合が増加してくる。よって外槽3を通過する汚水は、始め好気性微生物によって消化され、次に嫌気性微生物により消化分解除去される。【0020】その状態で槽内下部に到り、汚水中のSS（懸濁物質）と剥離脱落した微生物等は沈殿して汚水中から分離され、処理槽5の底部に溜って嫌気性微生物により分解される。外槽11を通過した、残余の有機物を含んだ当該汚水は内槽10に流入し、散気装置14からの曝気により溶存酸素の豊富な条件が保たれ、好気性微生物および原生動物等により効率よく消化分解される。このとき、有機物中の窒素も分解され、窒素ガスとして系外に担散する。かくして、リン含有有機性汚水は効率よく分解される。

【0021】浄化された水は、隔壁17に沿って上昇し、上端部の処理水出口18から溢流して沈殿槽28に送られ、侵入しているSS等の浮遊物を沈降分離後、放流口32から放流される。沈降した沈降汚泥30は配管8を通じて余剰汚泥貯留槽34に送られ、一部は処理槽5に返送され、沈降汚泥22の操作および活性汚泥（微生物）類として使用される。

【0022】生物処理された汚水中には有機物の分解でできたリン酸がイオンの状態で存在している。従来は嫌気性処理槽にマグネシウム化合物、鉄化合物等を注入してリンを補足し沈降処理していたが、本発明においては、処理槽5の下部に電解装置19を設けて金属マグネシウムを陽極とし、陰極にはマグネシウムより貴なる金属、たとえば鉄、銅などを用いる。この電解装置19に

(4)

特開平10-286583

5

6

直流電源21から直流電流を流すと、マグネシウムは電解され水中に溶け出す。そして水中に存在するリンと反応して不溶性のリン酸化合物となって沈降し、余剰汚泥とともに系外に排出される。

【0023】この余剰汚泥は凝集剤として、鉄、亜鉛、アルミニウム等、植物に有害な金属を使用していないため、乾燥して苦土（マグネシウム）リン含有の有機質肥料として有効に活用することができる。

【0024】処理槽5の底部に溜った沈降汚泥22は、嫌気性微生物によって分解されるが、底部より少し上部に接続された枝管24を通じて加圧注入ポンプ25により、沈降槽28の沈降汚泥30を含有した汚水を間欠的に加圧噴射し、攪拌してリンを拡散させ、マグネシウム*

*と反応させることで、より効果的に水中のリンを除去することができる。この方法は、沈降汚泥30を再処理するとともに、排出汚泥の減量も兼ねている。

【0025】図1に符号7、23、26および31で示すバルブは、必要に応じて自動的に、あるいは手動操作によって適宜開閉する。

【0026】

【実施例】以下、図1の装置を用いて行った本発明の実施例を説明するが、本発明はこれに限定されるものではない。使用した汚水は畜産工場の魚類関係廃水であり、その水質は、表1の調整槽原水を用いた。

【0027】

【表1】

資料 項目	調整槽原水 mg/L	①		②	
		調整水 (mg/L) 放流水 (mg/L)		調整水 (mg/L) 放流水 (mg/L)	
BOD	185.3	6.7	2.5	27.8	18.1
COD	72.8	3.2	2.8	9.5	6.8
SS	107.4	7.0	5.1	17.4	9.2
T-N	33.7	4.3	2.3	3.9	6.1
T-P	0.52	0.5	0.1	3.5	8.3

【0028】沈降性担体にはカキ殻を、幕状多孔質担体にはフェルトを使用した。また電解装置19の電極には陽極にマグネシウム板、陰極に銅板を用いた。内容積10リットルの処理槽5に、15日間、微生物を培養し、十分に担体に付着させた時点で槽内の水を抜き取り、資料原水を注入した。処理水の滞留時間を8時間、水温21～25℃で実施したところ、表1の①の結果を得た。

【0029】

【比較例】比較例として実施例と同じ内容積10リットルの処理槽5に、通常行われている沈降性担体を充填した床を設置し、気温20～25℃、滞留時間8時間、活性汚泥をMLSSとして3000ppm、SV₃₀10.5%で7日間培養してから資料原水を2lml/minのレートで連続注入して処理したところ、16時間後（資料原水2回分に相当）に採水して水質分析を行った結果、表1の②の結果を得た。

【0030】表1には、実施例と比較例が示されているが、実施例は比較例と比べ、BODが607mg/Lと有機物の分解がよく、総窒素量（T-N）も2.3mg/L、リンの処理能力も総リン量（T-P）が0.1mg/Lと99%の除去率であった。

【0031】

【発明の効果】本発明は、以上説明したように構成されたリン含有有機性汚水処理装置であるから、従来のリン含有有機性汚水の生物処理方法に、沈降性担体と幕状多孔質担体を併用することになるので、これらを使用しな

い従来のものに比べてBODが著しく減少する。

【0032】また、上記装置において前記処理槽の底部と散気装置の中間部に金属マグネシウム電極を使用した電解装置を設置したことにより、金属マグネシウムをイオン化することで、吸着剤を注入する装置が不要になり、労力の省力化が可能となる。

【0033】また、処理槽の沈降汚泥の攪拌に、先端を処理槽の内壁に沿うように曲げた小口径の枝管を設けたことにより、この枝管により沈降槽の沈降汚泥水を利用することができるので、特別に攪拌装置を設置することなく、沈降汚泥を攪拌することが可能となった。

【0034】さらに、廃棄汚泥にはアルミニウムや鉄などの植物に対する有害物質が含まれていないので、乾燥させて有機肥料として利用することができる。

【図面の簡単な説明】

【図1】本発明の実施の形態を示す系統図である。

【符号の説明】

- 1 調整槽
- 2 原水配管
- 3 揚水ポンプ
- 5 処理槽
- 6 原水流入口
- 9 陽極
- 10 内槽
- 11 外槽
- 12 保持体

(5)

特開平10-286583

- | | | | |
|----|-------|------|---------|
| 13 | 沉降性担体 | * 24 | 接管 |
| 14 | 散気装置 | 25 | 加圧注入ポンプ |
| 16 | 多孔質担体 | 28 | 沈殿槽 |
| 17 | 隔壁 | 29 | 処理水受入口 |
| 18 | 処理水出口 | 32 | 放流口 |
| 19 | 曝気装置 | * 34 | 余剰汚泥貯留槽 |

【図1】

